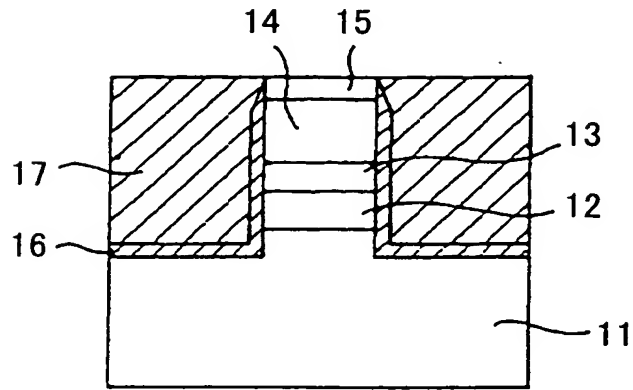


FIG.1 (PRIOR ART)



- 11: Semiconductor substrate
- 12: Buffer layer
- 13: Active layer
- 14: Cladding layer
- 15: Contact layer
- 16: Fe diffusion preventing layer
- 17: Fe-doped InP burying layer

FIG.2 (PRIOR ART)

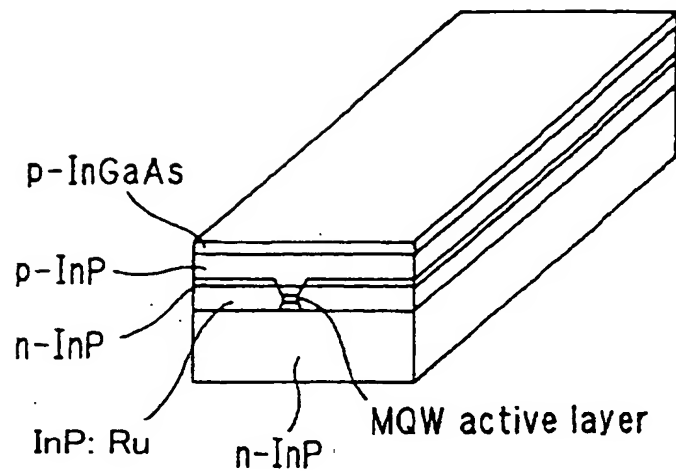
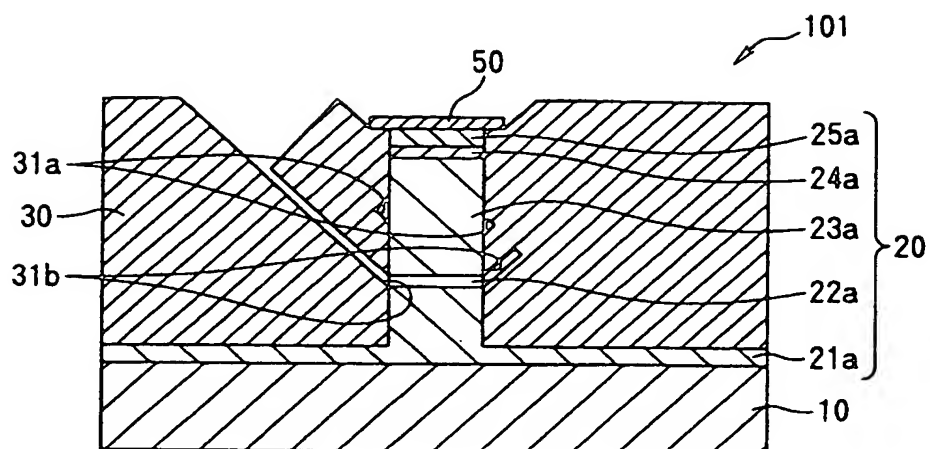


FIG.3 (PRIOR ART)



- 10: n-InP substrate
- 20: Semiconductor stacked body
- 21a: n-InP cladding layer
- 22a: Active region formed by MQW active layer
or MQW photoabsorption layer
- 23a: p-InP cladding layer
- 24a: p-InGaAsP contact layer
- 25a: p-InGaAs contact layer
- 31a: Void
- 31b: Void
- 50: SiO₂ mask

FIG.4

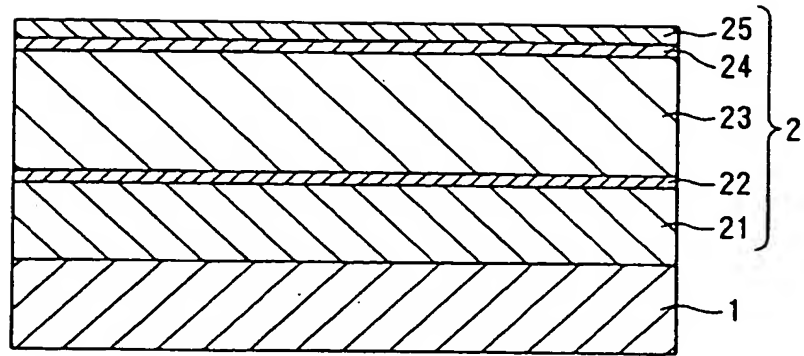


FIG.5

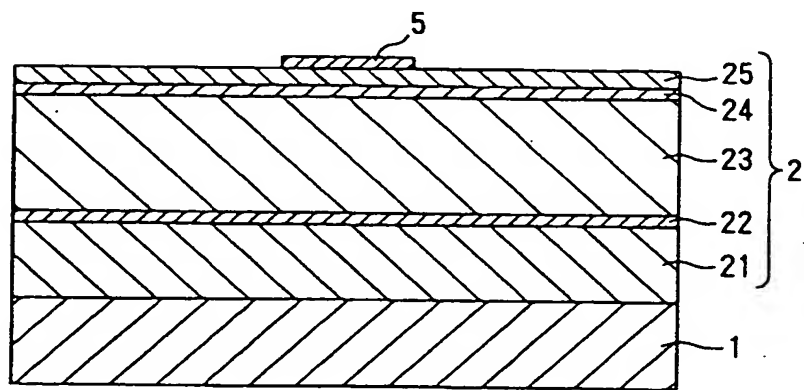


FIG.6

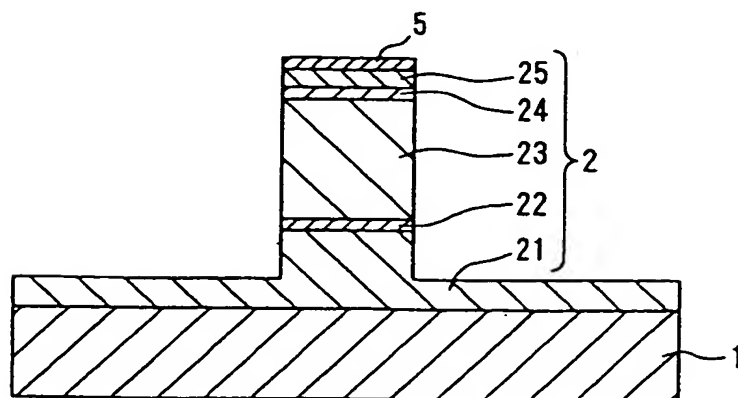


FIG.7

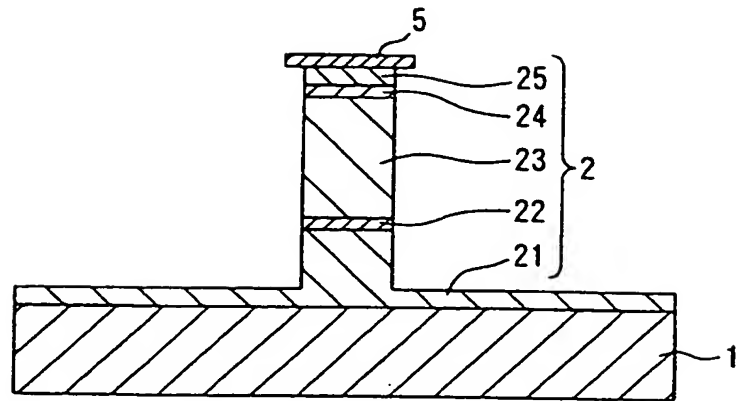


FIG.8

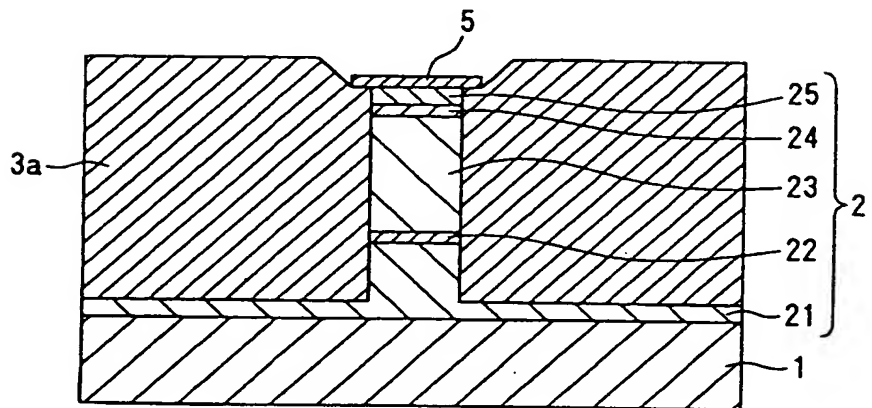
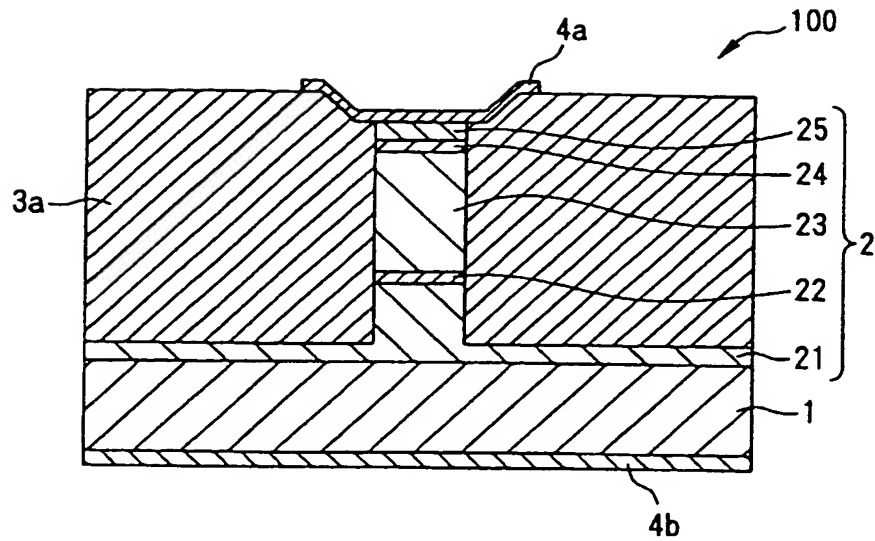


FIG.9



- 1: Semiconductor substrate
- 2: Semiconductor stacked body
- 21: n-InP cladding layer
- 22: Photoabsorption layer
- 23: p-InP layer
- 24: p-InGaAsP layer
- 25: p-InGaAs contact layer
- 3a: Compound semiconductor
- 4a: p-electrode
- 4b: n-electrode

FIG.10

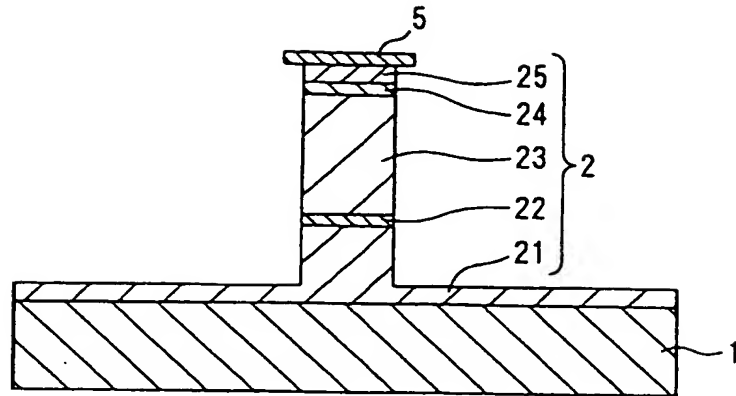


FIG.11

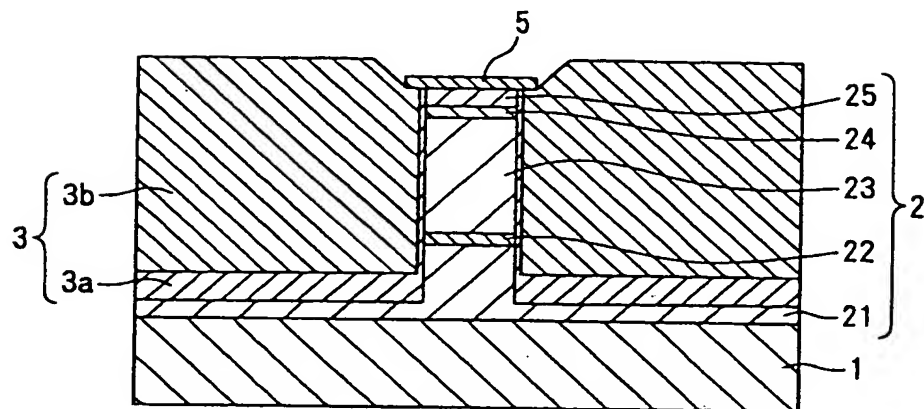
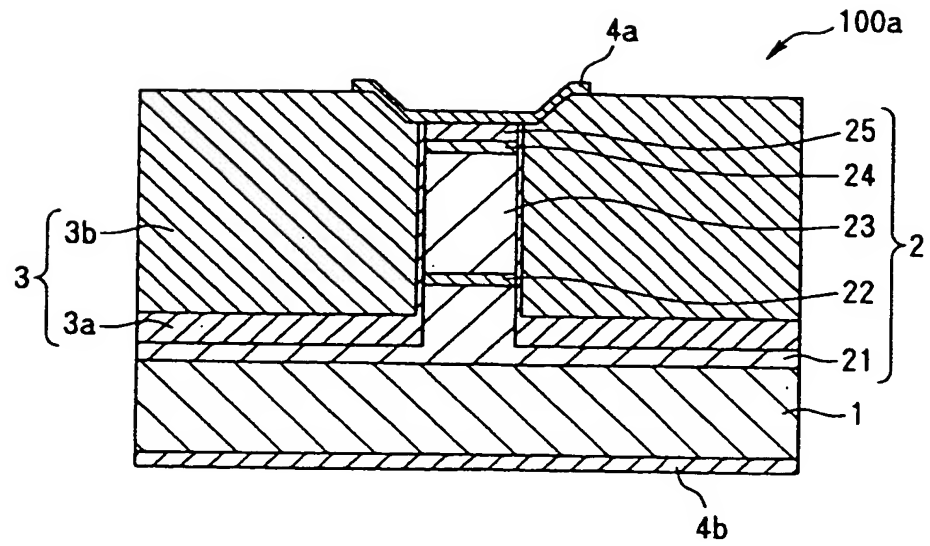


FIG.12



3: Burying layer
3a: Ru-doped InAlAs layer
3b: Ru-doped InP layer

FIG.13

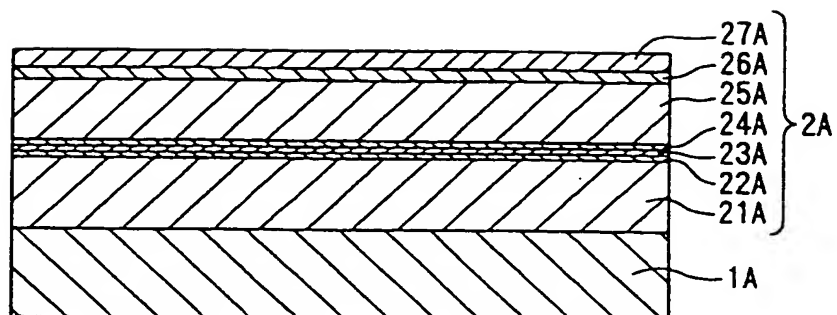


FIG.14

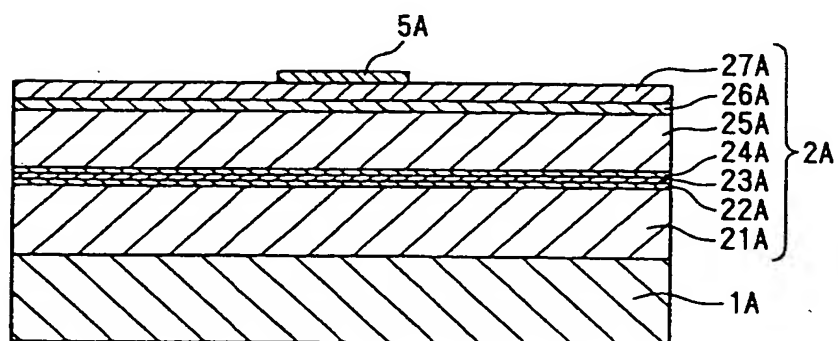


FIG.15

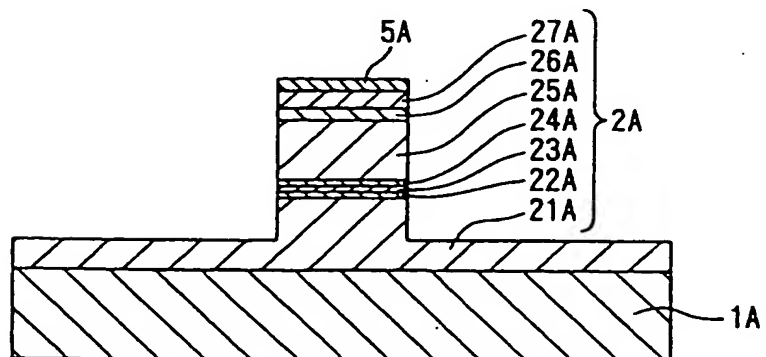


FIG.16

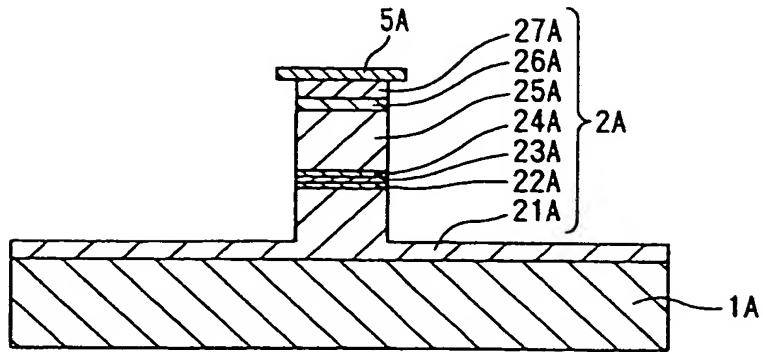


FIG.17

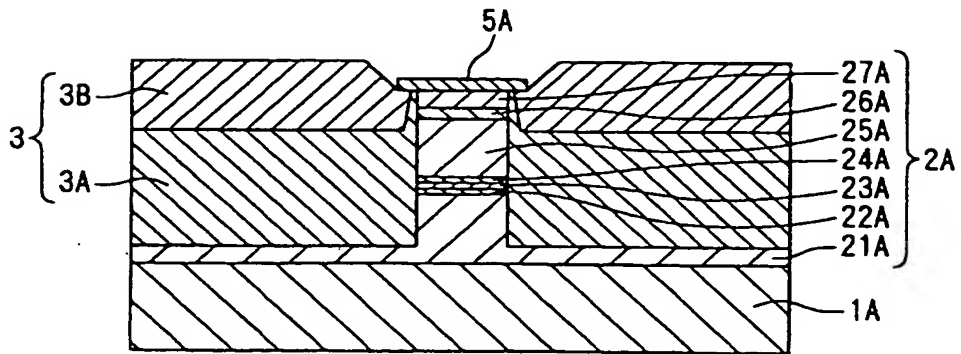
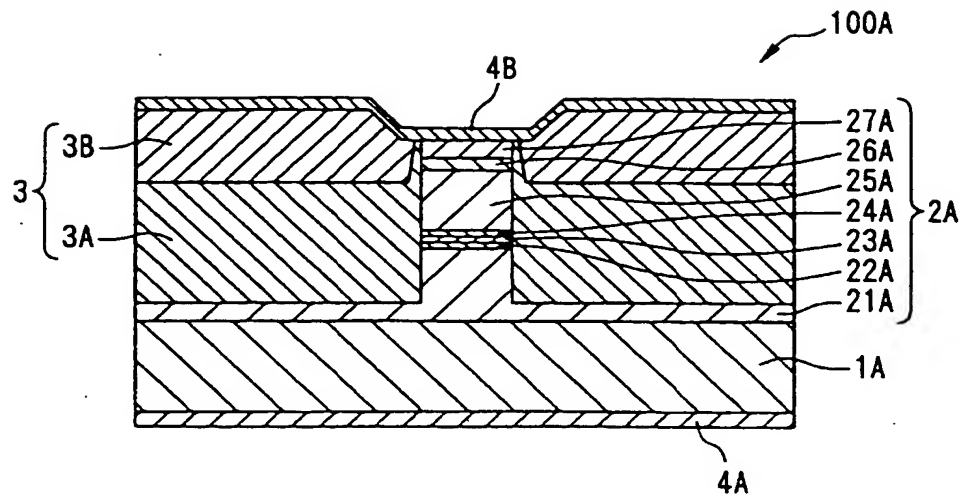
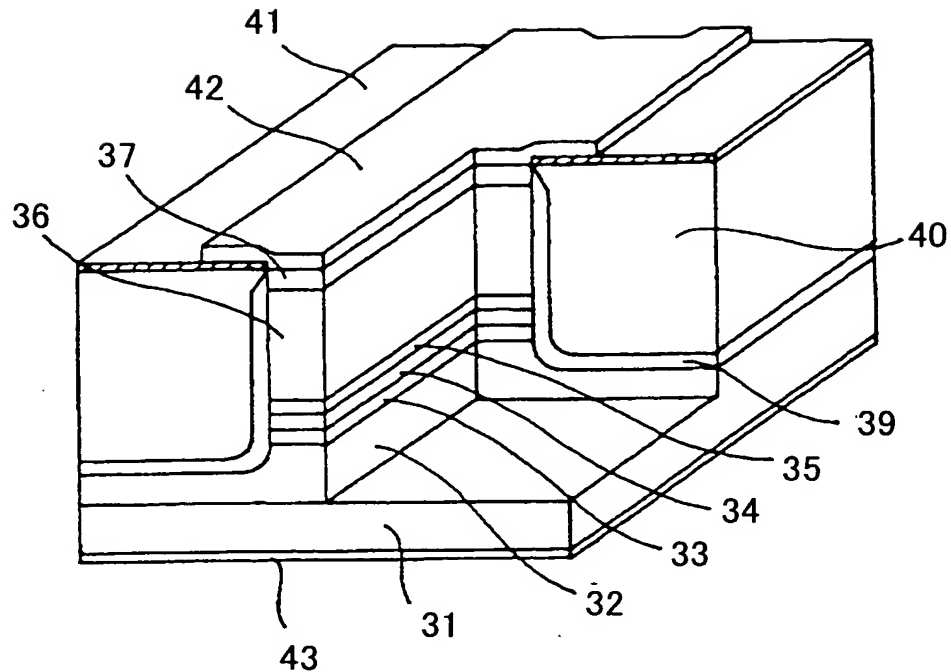


FIG.18



3: Burying layer
3A: Ru-doped InAlAs layer
3B: Fe-doped InP layer

FIG.19



- 31: n-InP substrate
- 32: Se-doped n-InP cladding layer
- 33: Nondoped InGaAsP guide layer
- 34: Nondoped InGaAlAs/InAlAs strained MQW (multiple quantum well) photoabsorption layer
- 35: Nondoped InGaAsP guide layer
- 36: Zn-doped p-InP cladding layer
- 37: Zn-doped InGaAs contact layer
- 38: SiO₂ mask
- 39: Ru-doped InP layer
- 40: Fe-doped InP layer
- 41: SiO₂ passivation film
- 42: p-electrode
- 43: n-electrode

FIG.20A

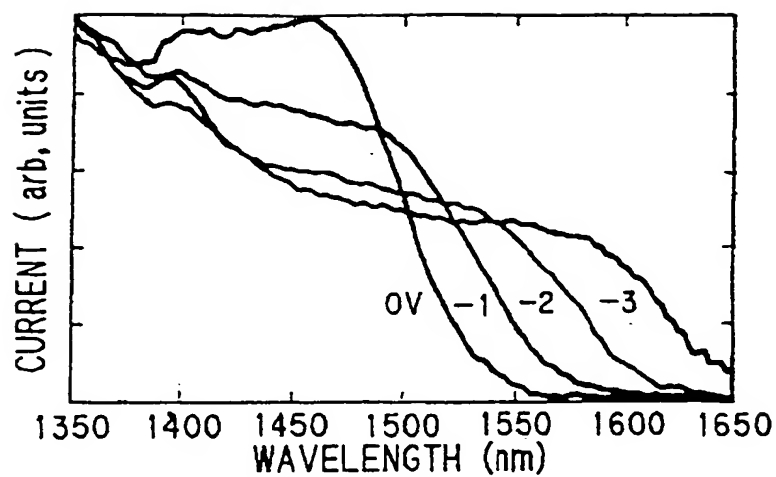


FIG.20B

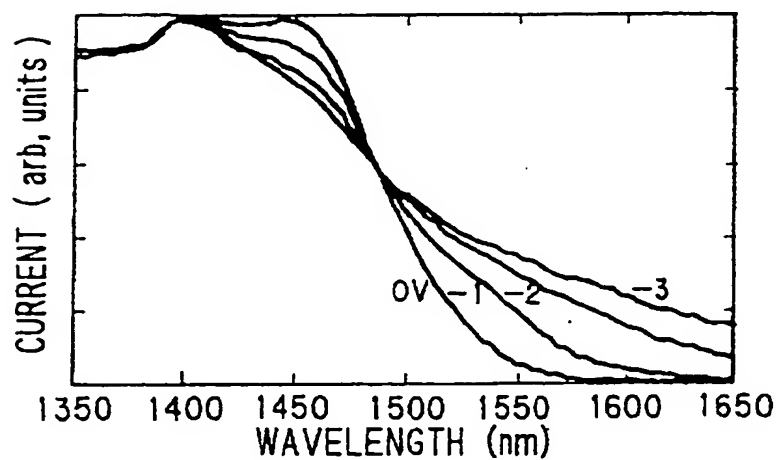


FIG.20C

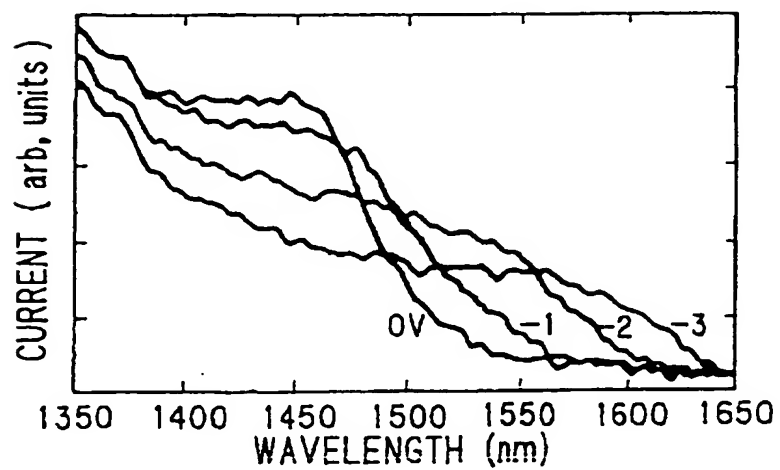


FIG.21

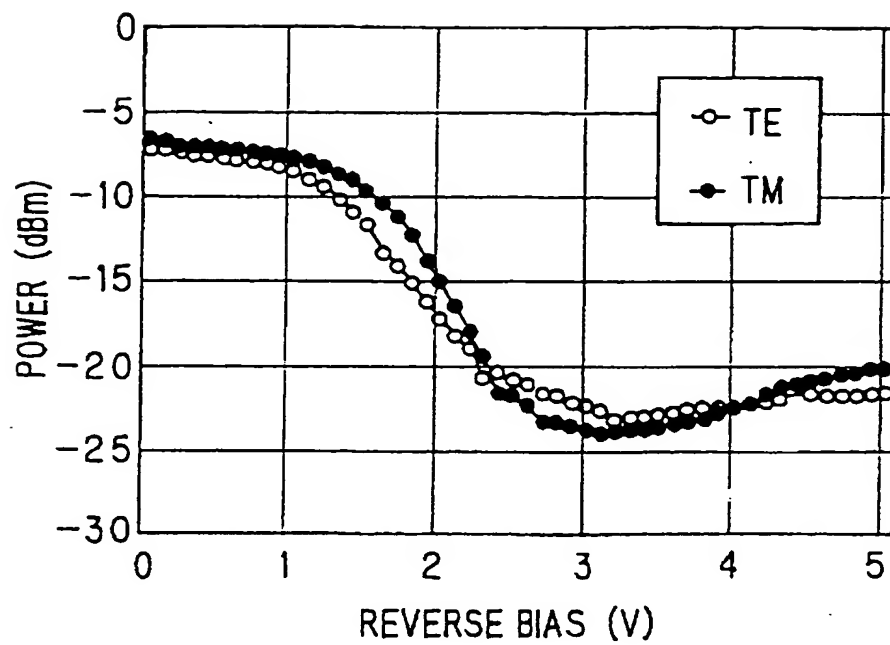


FIG.22A

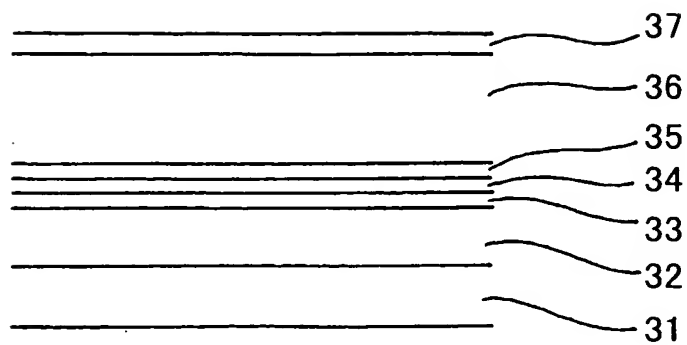


FIG.22B

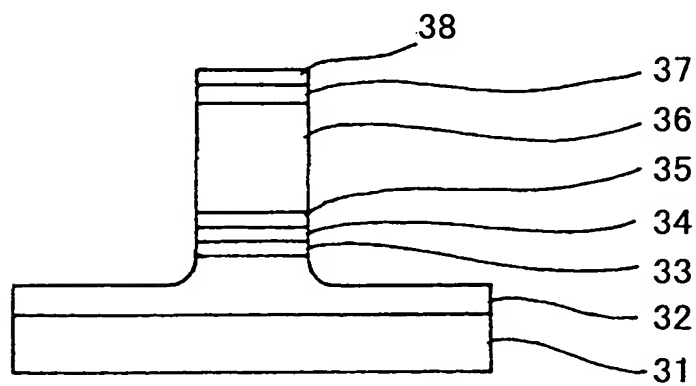


FIG.22C

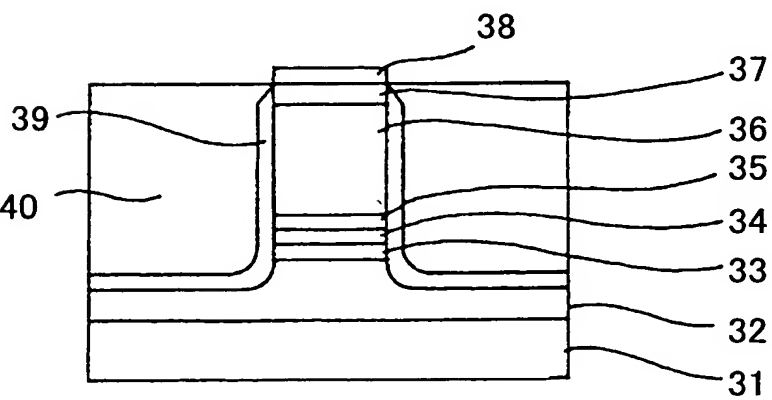
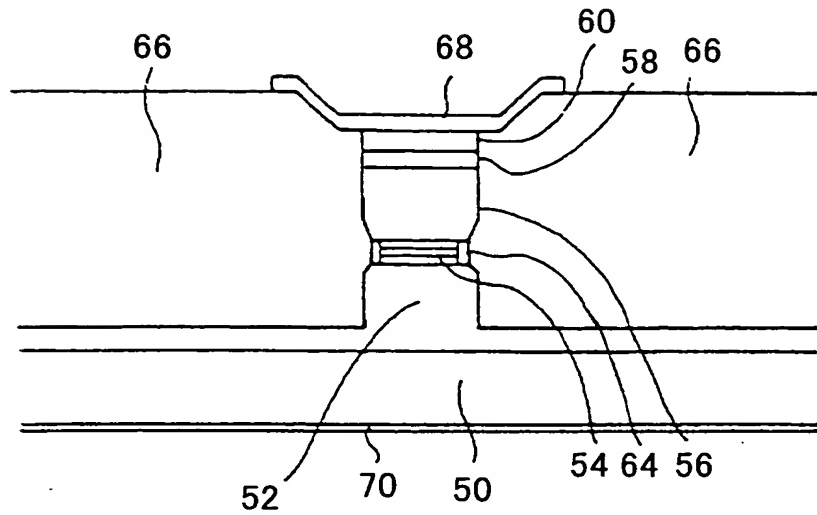


FIG.23



- 50: n-InP substrate
- 52: n-InP cladding layer
- 54: Photoabsorption layer
- 56: P-InP cladding layer
- 58: p-InGaAsP contact layer
- 60: p-InGaAs contact layer
- 62: Dielectric mask
- 64: Ru-doped layer
- 66: Semi-insulating InP burying layer
- 68: p-electrode
- 70: n-electrode

FIG.24A

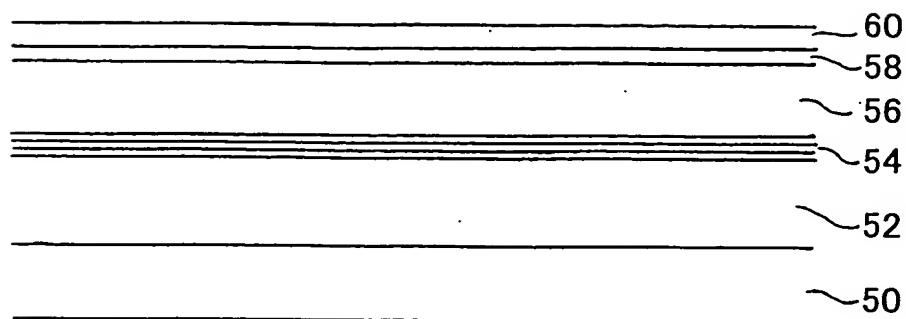


FIG.24B

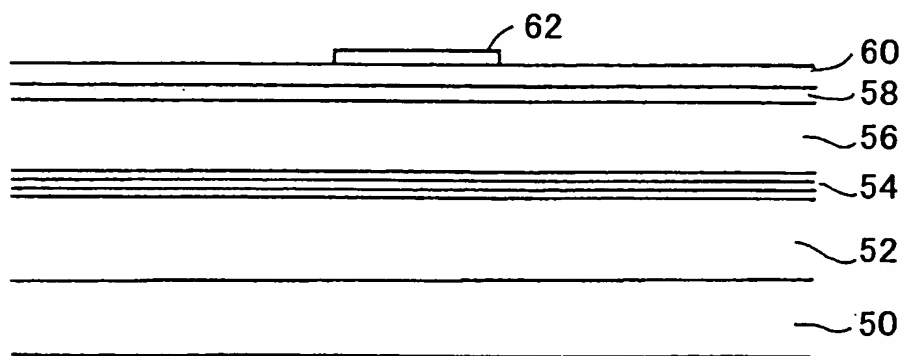
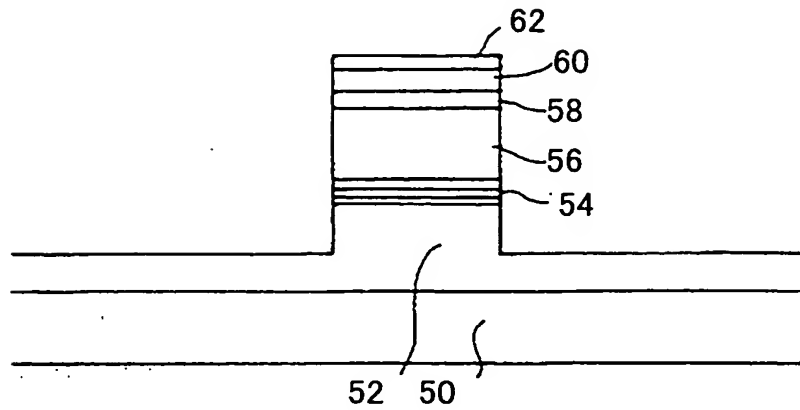


FIG.24C



- 50: n-InP substrate
- 52: n-InP cladding layer
- 54: Photoabsorption layer
- 56: p-InP cladding layer
- 58: p-InGaAsP contact layer
- 60: p-InGaAs contact layer
- 62: Dielectric mask

FIG.25A

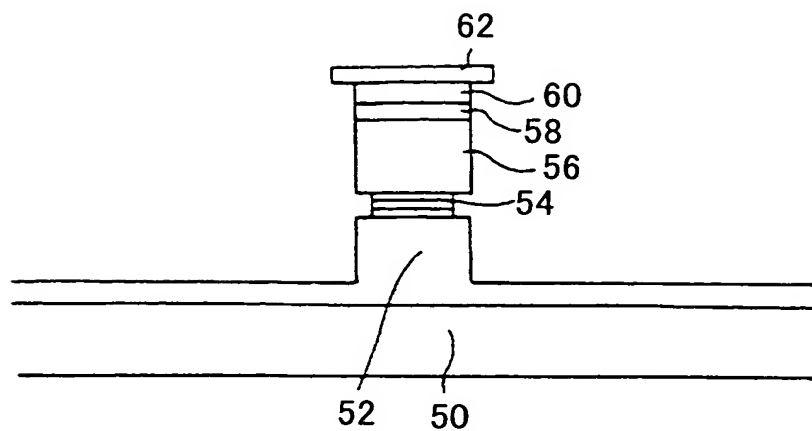


FIG.25B

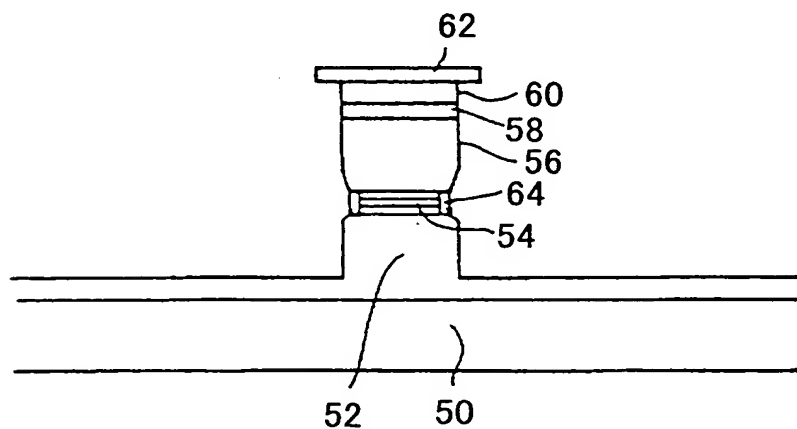
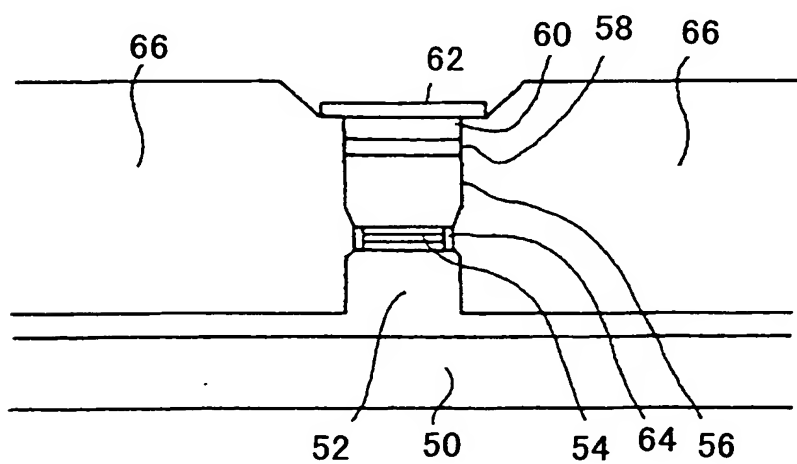


FIG.25C



64: Region formed by mass transport
66: Semi-insulating burying layer

FIG.26A

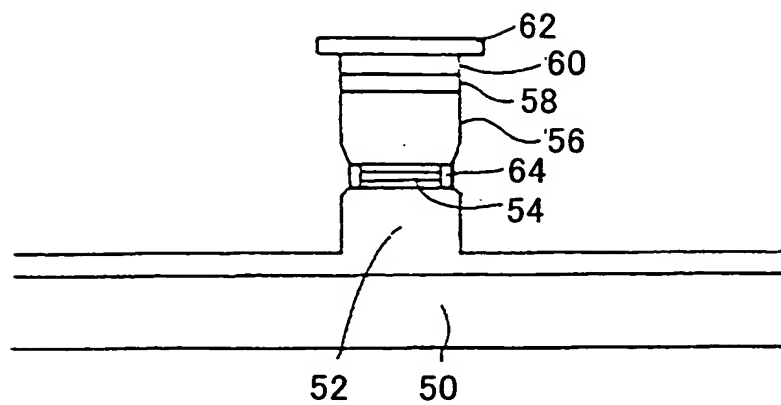


FIG.26B

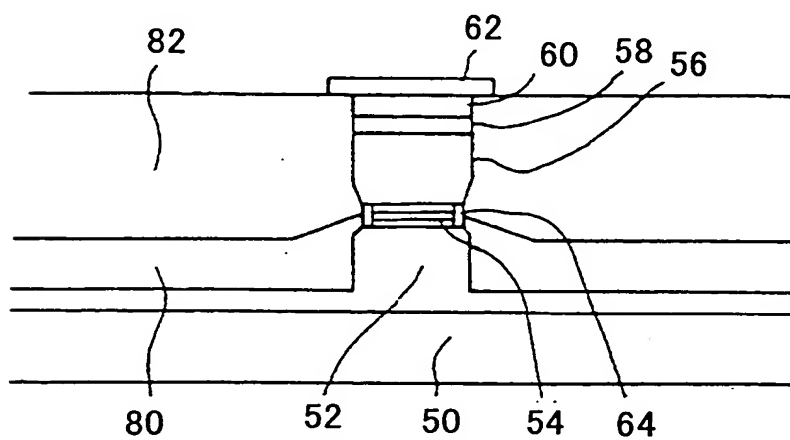
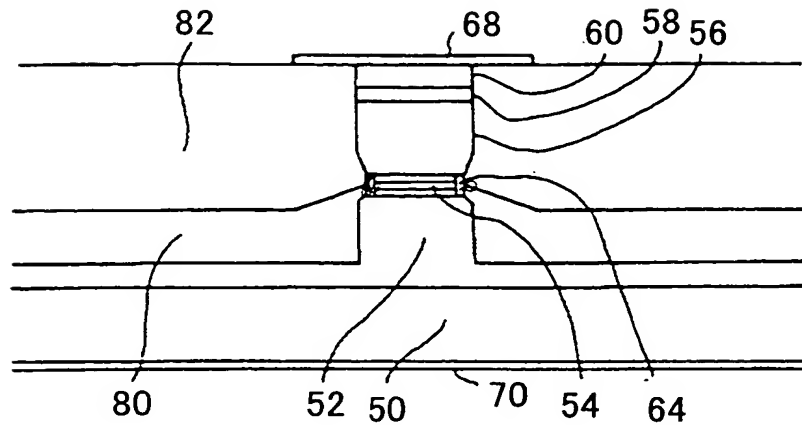


FIG.26C



- 50: n-InP substrate
- 52: n-InP cladding layer
- 54: Photoabsorption layer
- 56: P-InP cladding layer
- 58: p-InGaAsP contact layer
- 60: p-InGaAs contact layer
- 62: Dielectric mask
- 64: Region formed by mass transport
- 68: p-electrode
- 70: n-electrode
- 80: p-InP burying layer
- 82: n-InP burying layer